REMARKS

Claims 1-4, 6, 7, 9-11, 13, 17, 18 and 20-25 remain in the application. Claims 1, 4, 7, 11, 18 and 21 have been amended herein. Claims 5, 8, 12, 14-16 and 19 have been cancelled by this amendment.

THE EXAMINER'S OBJECTIONS / REJECTIONS AND APPLICANT'S RESPONSE

IN THE SPECIFICATION

THE EXAMINER STATES:

1. The disclosure is objected to because *of* the following informalities: Page 1, line 14, should be updated to reflect that continuation-in-part *of* application serial no. 09/253,859 is now US Patent No. 6,228,328. Appropriate correction is required.

The specification has been amended at Page 1, line 14 as required. Withdrawal of the objection is respectfully requested.

CLAIM REJECTIONS -35 USC § 103

THE EXAMINER STATES:

2. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castagnos, Jr. et al (4,060,395) and Luckenbach (3,494,858).

Response to Examiner's rejections of Claims 1 - 25

Although Applicant agrees with several points of the examiner's observation, it is necessary to start the discussion with clear definitions of the withdrawal well and the standpipe as commonly understood by a person having ordinary skill in the art of fluid catalytic cracking (FCC).

A withdrawal well is commonly defined as **a portion of conduit above the standpipe,** which has a **larger diameter than the standpipe** to provide surge capacity and to de-aerate fluidizing catalyst, thus preventing extra gas (bubbles) from entering the standpipe below. A standpipe is commonly defined as a catalyst transfer **conduit with a constant**

diameter all the way down to the slide valve to build pressure for transferring catalyst downwardly from one vessel to another.

Based on these definitions, Applicant agrees with the examiner's observation that element 28 in Figure 1 and element 78 in Figure 2 of Luckenbach are both withdrawal wells. Luckenbach provides the following description of a withdrawal well in an FCC apparatus:

> "Catalyst from the regenerator fluid bed 75 overflows into the upper portion 78 of standpipe 77, which has a larger diameter than the lower portion thereof to serve as a withdrawal well and provide surge capacity to accommodate small fluctuations in the rate at which the catalyst overflows." (col. 5, lines 65-70).

Element 28 in Figure 1 and element 78 in Figure 2 of Luckenbach are both withdrawal wells and the upper part of element 37 in Figure 1 and element 77 in Figure 2 are standpipes as noted by the examiner.

Based on the same definitions, Applicant also agrees with the Examiner's observation that "...the entire standpipe portion (114)..." of Castagnos, Jr. et al reads on a "catalyst withdrawal well" which covers the same portion of element 51 in Figure 5 (prior art) in the instant invention.

However, based on the same definitions, Applicant disagrees with Castagnos, Jr. et al's definition that element 114, or either of its comprising elements 115 and 116, is a standpipe. This is supported by the following facts.

1. If element 114 is, by definition above, the withdrawal well, with which the Examiner agrees, it cannot be, at the same time, the standpipe.
2. Both elements 115 and 116 are an integrated surge portion having larger diameters than the lower constant diameter section (the standpipe section) connecting to slide valve 117.
3. Element 116 has a frustroconic shape and does not have a constant diameter, thus it cannot be a standpipe, "...a lower frustoconic section 116...", (col 4, Line 23).
4. The function of element 116 fits the definition of a withdrawal well, "...within said lower standpipe section 116 hot regenerated catalyst from regenerator vessel 100 is deaerated...", (col 4, Lines 31-33).

5. In Figure 5 (prior art) of the instant invention, element 51 (same as element 114 of Castagnos, Jr. et al) was called the withdrawal well and element 56 below was called the standpipe.

Thus, the **entire upper portion of element 114 in Castagnos, Jr. et al., comprising elements 115 and 116, is a withdrawal well, not a standpipe.**

The basis of the examiner's rejection is the obviousness of the combination of Castagnos, Jr. et al's teaching of a withdrawal well and Luckenbach's teaching of slotted openings. The following discussion will show that the instant invention fundamentally differs from Castagnos, Jr. et al and Luckenbach and it is not an obvious extension or combination of either as stated by the examiner. The discussion will cover six key differences:

1. Neither Castagnos, Jr. et al or has a standpipe inlet section extending into the withdrawal well, whereas the instant invention does. In Castagnos, Jr. et al the withdrawal well (elements 114, 115 and 116) with a larger diameter is shown to directly connect to the standpipe below all the way to slide valve 117 without a standpipe inlet section extending into the withdrawal well. Similarly, in Figure 2 of Luckenbach the withdrawal well (element 78) with a larger diameter is shown to directly connect to the standpipe 77 below all the way to slide valve 87 without a standpipe inlet section extending into the withdrawal well.

In Figure 6 of the instant invention, a standpipe inlet section 70 extends into the withdrawal well 51, "The modifications provided by the instant invention include an extended standpipe section 70, which extends into the withdrawal well 51" (Page 10, Line 25 – 26), and "...an inlet portion of said standpipe extending into said catalyst withdrawal well..." (see Claims 1 and 21).

2. Luckenbach's slotted openings are in the top of the withdrawal well, whereas in the instant invention the slotted openings are in the top of the standpipe.

The slotted openings of element 79 are in the top of the withdrawal well of element 78 with a larger diameter than the standpipe 77, as shown in Figure 2 of Luckenbach, "...vertical slots 79 may be provided at the top of withdrawal well 78..." (Col. 5, Line 73 to 74). Similar slotted openings of element 29 are also shown in Figure 1 in the top of the withdrawal well of element 28.

In Figure 6 of the instant invention, the slotted openings of element 71 are shown in the top extension standpipe section 70 of the standpipe 56, which has a constant diameter and it is smaller than the diameter of the withdrawal well 51, "...the extended standpipe 70 also includes a plurality of elongated slot openings 71...", (page 10, Line 30). Similar slotted openings of element 112 are also shown in Figure 4 in the top of the standpipe 110.

3. Luckenbach's slotted openings are located at the **top** of the withdrawal well, whereas in the instant invention the slotted openings are located at the **bottom** of the withdrawal well and in the top of the standpipe.

The slotted openings of element 79 are located at the top of the withdrawal well of element 78 with a larger diameter than the standpipe 77, as shown in Figure 2 of Luckenbach, "...vertical slots 79 may be provided at the top of withdrawal well 78..." (Col. 5, Line 73 to 74). Similar slotted openings of element 29 are also shown in Figure 1 in the top of the withdrawal well of element 28.

In Figure 6 of the instant invention, the slotted openings of element 71 are shown to be located at the bottom of the withdrawal well 51 and at the top extension section 70 of the standpipe 56. (see Claims 1 and 21).

4. The bed level of the withdrawal well is bounded within the upper and lower ends of Luckenbach's slotted openings, whereas in the instant invention the slotted openings are completely submerged below the bed level in the withdrawal well.

The bed level 76 is bounded by the upper and lower ends of the slotted openings of element 79, as shown in Figure 2 of Luckenbach. This is critical in Luckenbach's teaching because if the bed level 76 is above the upper end of slotted openings of element 79 and the slotted openings are completely submerged, it will lose the primary function of reducing level variation.

In Figure 5 (prior art) of the instant invention, "....the withdrawal well 51 and maintains a fluidized bed level 57.... " (page 7, Line 23), which bed level is shown to be higher than the inclined standpipe 53. Although the bed level 57 was not shown in Figure 6 of the instant invention, it is understood that the same bed level shown in Figure 5 does apply, and the slotted openings of element 71 are completely submerged below the bed

level. Similar slotted openings of element 112 are also shown in Figure 4 to be completely submerged below bed level 150. (see Claims 1 and 21).

5. The function of Luckenbach's slotted openings is to permit slight variation in catalyst level, whereas the function of the slotted standpipe extension of the instant invention is to reduce gas entrainment into the standpipe. Castagnos, Jr. et al's withdrawal well fails to achieve this.

Luckenbach's slotted openings of element 79 are located in the top of the withdrawal well of element 78, and their primary function is to permit slight variation in catalyst level 76, "...vertical slots 79 may be provided at the top of withdrawal well 78 to give a smoother rate of catalyst withdrawal, and to permit slight variations in catalyst level 76...", (Col 5, Line 73 to Col. 6, Line 1).

In the instant invention, slotted openings of element 71 are shown in the top extension section 70 of the standpipe 56 and their function has nothing to do with level control of bed level 57 in the withdrawal well 51; instead, the function of slotted openings of element 71 is to reduce gas entrainment into the standpipe 56, "The combination of the fluidization injection 72 and the extended standpipe section 70 having a plurality of elongated slots 71 reduces gas entrainment into the standpipe 56..." (Page 11, Lines 10 to 12). (see Claims 1 and 21).

6. Luckenbach's slotted openings do not include fluidization injection means in the vicinity of the slotted openings, whereas the instant invention does.

Luckenbach's slotted openings do not include fluidization injection means in the vicinity of the slotted openings. This is not surprising because the function of slotted opening 79 is to permit slight variation in catalyst level 76.

In the instant invention, not only does the extension standpipe 70 include fluidization injection 72 in the vicinity of the slotted opening 71, but the relative position of the two is also critical, "...the extended standpipe 70 also includes a plurality of elongated slot openings 71, at a level near or below the fluidization injection 72...", (page 10, Line 30-31). The combination of the fluidization injection 72 and the extended standpipe section 70 having a plurality of elongated slots 71 reduces gas entrainment into the standpipe 56 (Page 11, Line 10 to 12). The combination has the function to reduce gas entrainment into the standpipe 56, "The combination of the fluidization injection 72 and the extended

standpipe section 70 having a plurality of elongated slots 71 reduces gas entrainment into the standpipe 56." (Page 11, Line 10 to 12).

Claims 1, 4, 11, 18 and 21 have been amended herein and are now believed to distinguish over the references.

THE EXAMINER STATES:

> With regard to claims 1, 2, 21, and 22 Castagnos, Jr. et al. discloses the regeneration portion *of* an apparatus for a fluidized catalytic cracking unit (col. 1, lines 5-9) comprising:
>
> a regenerator (100), a catalyst withdrawal well (114) spaced from said regenerator (100); a downwardly inclined standpipe (113) having its upper end fluidly connected to said regenerator (100), and its lower end fluidly connected to said catalyst withdrawal well (114) (col. 4, lines 13-20); a standpipe (116) for receiving catalyst from said catalyst withdrawal well (col. 4, lines 26-32), said standpipe having an open end fluidly connected into said catalyst withdrawal well (col. 4, lines 26-27).
>
> Though Castagnos, Jr. et al. does not recite element 114 specifically as a "catalyst withdrawal well", the entire standpipe portion (114) reads on a "catalyst withdrawal well". This is evidenced by Luckenbach. Luckenbach provides the following description of a withdrawal well in an FCC apparatus:
>
> > "Catalyst from the regenerator fluid bed 75 overflows into the upper portion 78 of standpipe 77, which has a larger diameter than the lower portion thereof to serve as a withdrawal well and provide surge capacity to accommodate small fluctuations in the rate at which the catalyst overflows." (col. 5, lines 65-70)
>
> In Castagnos, Jr. et al., there is an upper portion (115) of the standpipe (114) which has a larger diameter than the lower portion (116) thereof (col. 4, lines 20-25)), since the structural formation is the same as that of Luckenbach, it is held that the standpipe (114) of Castagnos, Jr. et al. is a "withdrawal well".
>
> Castagnos, Jr. et al. fails to disclose a plurality of openings cut through the wall of said extended standpipe below said open upper end and above the floor of said catalyst withdrawal well.
>
> Luckenbach teaches a standpipe (77) of a withdrawal well with vertical slots (79) provided below the open upper end to "give a smoother rate of catalyst

withdrawal, and to permit slight variations in catalyst level without large fluctuations in the rate at which catalyst overflows into the withdrawal well" (col. 5, line 73- col. 6, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide vertical slots in the wall of the standpipe of Castagnos, Jr. et al. in order to achieve the advantages of a smoother rate of catalyst withdrawal and to allow for variations in catalyst level, as taught by Luckenbach.

Applicant's comments with regard to Claims 1-25 above are believed to fully address this rejection also.

THE EXAMINER STATES:

With regard to claims 3 and 23 Castagnos, Jr. et al. further includes means for injecting fluidizing gas (107 and 108) above said floor of said catalyst withdrawal well (the floor of the well is interpreted as where slide valve 117 can close off the withdrawal well).

Response to Examiner's rejections of Claims 3 and 23

In Castagnos, Jr. et al's Figure 1, means for injecting fluidizing gas, Elements 107 and 108, are above the floor of lower regenerator section 101, "...primary regeneration gas distribution means 107 are intimately mixed and radially distributed within the bottom of lower regenerator section 101. In the drawing, a secondary regeneration gas conduit 110 passes into the lower portion of upper regenerator section 101 ..... to a secondary gas distributor 108...", (Col. 3, Line 42-49). These fluidization means, 107 and 108, are not in the withdrawal well 114.

On the other hand, Applicant's fluidization means 72 is shown to be within the withdrawal well 51 and above the floor of the withdrawal well for maintaining fluidization, "The combination of the fluidization injection 72 and the extended standpipe section 70 having a plurality of elongated slots 71 reduces gas entrainment into the standpipe 56, thus allowing withdrawal well 51 to maintain a fluidization condition at all time..." (Page 11, Line 10 to 13).

The teaching of Castagnos, Jr. et al's gas injection rings, 107 or 108, are totally irrelevant to the instant invention because the rings are located in an entirely different vessel. Although injection rings (107 & 108) are located above slide valve 117 in Castagnos, Jr. et al's Figure 1, as observed by the examiner, gas injection rings (107 and 108) and slide valve 117 are separated horizontally in two different vessels, 104 and 114, and the gas injection

from 107 and 108 is irrelevant to element 117, which is understood by a person having ordinary skill in the art of fluid catalytic cracking (FCC).

THE EXAMINER STATES:

> With regard to claims 4, 7, 11, 14 and 18, as it has been discussed with respect to claim 1, above, that Castagnos, Jr. et al. discloses wherein a standpipe (114, 115, 116) is part of a withdrawal well of a fluid catalytic cracking unit.

Response to Examiner's rejections of Claims 4, 7, 11, 14 and 18

Claims 4, 7, 11, and 18 are dependent claims of claim 1 and have been amended herein to more definitely distinguish over Castagnos, Jr. et al, which does not include the extension of standpipe section (element 70 in Figure 6 of the instant invention) and slotted opening (element 71 in Figure 6 of the instant invention) at the bottom of the withdrawal well. .

Claim 14 has been cancelled by this amendment.

THE EXAMINER STATES:

> With regard to claims 5, 8, 12, 15 and 19, Castagnos, Jr. et al. discloses that the catalyst flows from standpipe (116) "for contact with a hydrocarbon charge stock in a fluidized catalytic cracking reaction section (not shown)" (col. 4, lines 32-38), but fails to explicitly disclose that there is a stripper in this FCC unit.
>
> Luckenbach teaches a FCC reaction section, such as that which is alluded to, but not shown by Castagnos, Jr. et al. In the teaching by Luckenbach, it is shown that the standpipe of the withdrawal well (77) is connected to a stripper (82) of the fluid catalytic cracking unit (col. 6, lines 3-26) and then the catalyst is contacted with hydrocarbon feed stock (66) as required, but not shown, by Castagnos, Jr. et al. Since Castagnos, Jr. et al. requires that catalyst from the standpipe contact with a hydrocarbon feed in an FCC reaction section, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the standpipe of Castagnos, Jr. et al. as part of a stripper for an FCC reaction, as it is merely a part of a conventional fluidized catalyst cracking section required by Castagnos, Jr. et al. and as taught by Luckenbach.

Response to Examiner's rejections of Claims 5, 8, 12, 15 and 19

Claims 5, 8, 12, 15 and 19 have been cancelled by this amendment.

THE EXAMINER STATES:

> With regard to claims 6, 9, 13, 16 and 20, Castagnos, Jr. et al. discloses wherein the standpipe (114, 115, 116) is part of a regenerator (100) of a fluid catalytic cracking unit (col. 4, lines 10-24).

Response to Examiner's rejections of Claims 6, 9, 13, 16 and 20

Claims 6, 9, 13, and 20 depend from and further restrict Claim 1 of the instant invention. The standpipe defined in claim 1 is different from the prior art of Castagnos, Jr. et al. wherein the standpipe (114, 115, 116) is, in fact, the withdrawal well, as already discussed in the Response to Examiner's rejections of Claims 1 – 25 above.

Claim 16 has been cancelled by this amendment.

THE EXAMINER STATES:

> With regard to claims 10, 17, 24 and 25 Castagnos, Jr. et al. discloses wherein the means for injecting fluidizing gas includes at least one ring (col. 3, lines 25-32 and col. 3, lines 49-54) and it can be seen in the figure that at least one gas injection ring (108) is located at a level near the open upper end of the standpipe (116).

Response to Examiner's rejections of Claims 10, 17, 24 and 25

Castagnos, Jr. et al. discloses wherein the means for injecting fluidizing gas includes at least one ring (col. 3, lines 25-32 and col. 3, lines 49-54) of elements 107 and 108, which are in the vicinity of lower **regenerator section 101**. On the other hand, claims 10, 17, 24 and 25 depend from and further restrict Claims 1 or 21 of the instant invention with a fluidization injection ring at the **bottom of the withdrawal well and in the vicinity of the slotted openings** 71 of the extended standpipe 70. The teaching of Castagnos, Jr. et al's gas injection ring, 107 or 108, is totally irrelevant to the instant invention because the ring is located in an entirely different vessel.

Although "... at least one gas injection ring (108) is located at a level near the open upper end of the standpipe (116)..." in Castagnos, Jr. et al's Figure 1, as observed by the examiner, gas injection ring 108 and element 116 are separated horizontally in two different vessels, 104 and 114, and the gas injection from 108 is irrelevant to element 116, which is understood by a person having ordinary skill in the art of fluid catalytic cracking (FCC).

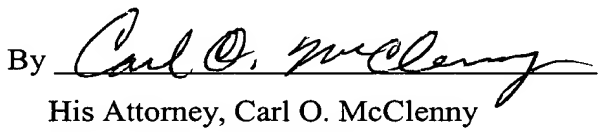
Applicants respectfully request reconsideration of all claims (1-4, 6, 7, 9-11, 13, 17, 18 and 20-25) now pending in the application and submit that, in view of the amendment of Claims 1, 4, 7, 11, 18 and 21 and arguments above, and the cancellation of Claims 5, 8, 12, 14-16 and 19, the Examiner's rejection of these claims have been overcome. The Examiner is respectfully requested to withdraw the rejection.

It is believed that no additional fees are required by this amendment other than for the accompanying Request For Extension of Time. If this is in error, please charge any such fees to Deposit Account No. 19-1800.

If the Examiner feels that a telephone conversation would assist in bringing this case to a conclusion, he is requested to contact the undersigned at 713-782-3620.

Respectfully submitted,

YE-MON CHEN, et al.

By 

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